

6lo WG Agenda - IETF 99, Prague,

15:50-17:50 Local Time Tuesday, July 18, 2017

Chairs: Samita Chakrabarti, Gabriel Montenegro

Secretary: James Woodyatt

Responsible AD: Suresh Krishnan

Minute taker: Dominique Barthel

Jabber Scribe: Thomas Watteyne

Introduction and draft status

Montenegro/Chakrabarti

* WG status: 2 new RFCs since Chicago (RFC 8105- Dect-ule, RFC 8163 – 6lobac) + AD sponsored document on information elements for 802.15.4 (RFC 8137)

* dropped draft-ietf-6lo-mesh-link-establishment due to loss of interest by proponents

Other working group drafts: draft-ietf-6lo-backbone-router, draft-ietf-6lo-ap-nd and draft-ietf-6lo-rfc6775-update are in progress. Draft-ietf-6lo-nfc received comments and the author will refresh the document by next IETF. Draft-ietf-6lo-blemesh is waiting for an implementation before the next revision. Draft-ietf-6lo-use-cases draft has been revised to focus on guidance and applicability of IPv6 over constrained node networks.

An Update to 6LoWPAN ND

Pascal Thubert

<https://tools.ietf.org/html/draft-ietf-6lo-rfc6775-update-06>

Updates and status

* Extracted 6775 _update from -backbone draft. The rfc6775 is L3 association process, while backbone router describes proxy ND when multiple L2 6lo networks are joined to form a single layer3 network.

* Samita provided extensive review during LC. Plus the revised version addressed comments raised at IETF98 (previous IETF).

* removed references to 6550 regarding TID, some info maybe missing. Added recommendation to use RFC7400

* separated privacy discussion from security considerations.

* one implementation is ready, aware of another one

* ND requires reliable multicast. Multicast is usually sent as broadcast, not reliable. RFC4862 (Stateless Address Autoconfiguration) cannot operate as designed, on wireless networks where L2 multicast support is not available.

* 802.11 expects proxy operation and broadcast domain separation, imperfect.

* This work bridges the gap.

* passed WGLC. Do chairs think we have enough review?

* Gabriel M: on missing text, would rather have self-contained document.

* Rahul: proxy ... ? Pacal: which proxy? the root of DODAG can register the .. to the proxy. TID inside DAO will allow root to maintain state on behalf of node. This work registers the Target as opposed to the Source address.

* Rahul: possible from 6BBR to de-register on behalf of target? Gets complicated with TID. Pascal: would need to think about it, should Nopath_DAO cause a de-register?

* Pascal: let's bring this to the mailing list, no quite sure what's currently in the text.

* Samita: Regarding extending WGLC, suggest to have a short extension after next revision published.

* Pascal: depending on amount of changes. However, do we think we have enough review?

* Gabriel: we know there are more comments coming, let's give them more time and publish the revised document like any other LC document.

* Samita: agreed.

<https://tools.ietf.org/html/draft-ietf-6lo-backbone-router/>

* Republished because of expiration. Implementation exists, demoed at ETSI plugtest.

* not tested 6BBR-6BBR across implementations, because there is only one implementation!

* shown to IEEE

* would love to see open source implementation.

* is this ready for WGLC?

<https://tools.ietf.org/html/draft-ietf-6lo-ap-nd/>

* Performs source address validation (SAVI). Proof of ownership, when node moves, or re-iterated registration.

* ready for first review by security directorate. Tero Kivinen to review.

6lo Applicability and Use Cases

Yong-Geun Hong

<https://tools.ietf.org/html/draft-ietf-6lo-use-cases-02>

* WG adoption Nov, 2016.

* Goal is to "help newcomer understand 6lowpan technologies ..."

- * Draft shortened and cleaned up. Lists and describes 7 link layer technologies. Describes deployment scenarios with Wi-Sun and JupiterMesh
- * Shows link layer technology comparison tables on screen.
- * Lists considerations to be taken into account when considering porting 6LoWPAN onto another link layer technology.
- * Goes quickly over the two deployment scenarios.
- * List 15 dimensions of the design space for use of 6Lo
- * other use cases moved to Appendix
- * Kerry Lynn: useful survey. MS-TP is different from others (wired vs wireless). Figure of merit such as goodput*distance or something like that, to help reader to choose technology
- * Yong-Geun: PCL also wired. Will think about metric. Help appreciated.
- * Pascal: experience from the field: benefit of L3 routing is that it allows to build network and change L2 technology later in some places.

Packet Expiration Time in 6Lo Routing Header

Charlie Perkins

10 min

<https://www.ietf.org/id/draft-lijo-6lo-expiration-time-03>

- * This is about communicating delivery deadline time in 6LoWPAN networks. Allows dropping packet if too late, and measuring transit time in network.
- * Since last revision, added ASN as possible time unit.
- * Name of draft says "expiration", should become "deadline"
- * Charlie shows format
- * Pascal: supportive of this. You should drop as soon as you know the packet won't make it. Requires to know transit time of remaining part of the rest of the path. With source routing, Root could compute intermediate deadlines at each hop.
- * Charlie: would love to have this fine-grained level of planning, not sure real networks can do this. Is it worth the added complexity?
- * OpenWSN implemented an EDF (Earliest Deadline First) policy based on this.
- * Kerry Lynn: back to Pascal's question. Not all hops have same "cost" (transit time). Where is time spent? propagation, queuing, ...?
- * Charlie: just want have a deadline so know it's too late.
- * Thomas: to Kerry's question: depends on technology. In 6TiSCH, transit time is mostly queuing, waiting for the next slot

- * Kerry: ?
- * Charlie: ?
- * Samita: About time synch mechanism/protocol, any recommendation?
- * Charlie: will post on the mailing list, and add text in the draft
- * Thomas: time synch, can answer on our implementation. 100us. In commercial implementation, 10-15us. But not related to this draft.
- * Charlie: could insert words of caution in the draft that operating on timestamps may provide misleading results
- * Gabriel: if D bit set, text says SHOULD drop. Anything bad can happen if implementation does not obey SHOULD? Then maybe turn it into MUST
- * Thomas: Recommend to put MUST.
- * Pascal: This header is optional to process.
- * Suresh: can say MUST, but sender cannot expect it to be observed if intermediate router does not implement this.
- * Pascal: application cannot rely that packet will *not* be delivered after deadline. On;y use it as "discard preferably to other packets" after deadline.
- * Peter VDS: if network and application is actually real time, will make sure this draft is implemented in all routers and make this a MUST.
- * Gabriel: will continue this discussion on mailing list and call for adoption after that.

Transmission of IPv6 Packets over PLC Networks

Jiangquiang Huo

<https://tools.ietf.org/html/draft-huo-6lo-plc-01>

- * Examples of PLC usage has been provided
- * Updated draft since Chicago and ensuing comments
- * Comments from Stefano(chair of ITU-T Q15)
- * EUI-64 long address to start operation, 16 bit short address
- * updated section on ND, differentiated text for 1901.2 and G.9903
- * cleared up confusion in description of topology
- * intend to add more PLC standards: G.9904, IEEE 1901.1
- * Pascal: good to have this work resurrected since Daniel Popa's work many years ago. If IETF specifies this, will ITU-T use it or is it a competition? Did they ask for this? What do we do this here?

- * Jiangquiang: would like to combine all PLC technologies into one draft
- * Pascal: Are we chartered by the other SDO's to do this work?
- * Jiangquiang: they did not ask anything, but reviewed this draft and seem happy.
- * Gabriel: no conflict with ITU-T, they have provided comments. Yet, valid point, clarify relative positions.
- * Gabriel: liaison has very specific meaning at IETF. Already some liaisons with ITU-T. Should not create more, just work with them at technical level.
- * Samita: Agree with Gabriel on collaboration with ITU-T. Got positive comments from ITU-T SG-15 chair. If anything new, we should communicate to them and agree with them.
- * Pascal: If this is informational doc about what they do, fine. If this is something new then
- * Suresh: Are you saying this overlaps with work they do?
- * Pascal: ITU-T asked for the Escape code, because they do stuff with 6LoWPAN over PLC. Make sure that this does not overlap.
- * Gabriel: continue this on the mailing list. Seems like a valid concern. When resolved favorably, will call for adoption.

Transmission of IPv6 packets over IEEE 802.15.6 WBAN Sajjad Akbar

<https://tools.ietf.org/html/draft-sajjad-6lo-wban-00>

- * This is aimed at standard track.
- * Motivations for this work: remote health care, increasing part of GDP
- * WBANs standardized at IEEE 802.15.6. Operation close to / in human tissue, specific regulations
- * Aims at 2-5 m range. low frequency bands.
- * why a new standard? other systems targeted at other requirements/environments
- * This is lower power (1-5 mW), 10k-1Mbps. Some frequencies as low as 16 or 40 MHz for in-body operation.
- * why IPv6? part of Internet of Things
- * Issues:
- * Suresh: read the draft, nothing about IPv6. Only states that 6LoWPAN does not fit. What's the goal of this draft?
- * Sajjad: will update the draft.
- * Gabriel: as a chair, there's nothing in this draft for the WG to do. Only information so far. For next time, think about this

* Pascal: do you want to build a mesh? 6TiSCH as opposed to regular 15.4? Would love to build a mesh... What is missing in 6TiSCH?

* Sajjad:

* Alex Petrescu: nice draft. Frame format 300 bytes, is this max transmission limit?

* Sajjad: 256 actually.

Fragmentation Update:

Fragmentation flow control and recovery

Pascal Thubert

<https://tools.ietf.org/html/draft-thubert-6lo-forwarding-fragments-05>

10 min

* At last IETF meeting, presented short-comings of 4944 regarding fragmentation. Slides in appendix of this slide deck.

* Have been working on fragmentation for LPWAN, can reuse some of that here.

* In IoT space, apps run over UDP, expect very long round trip time.

* In L3 mesh(RPL), need to fragm/reassemble at each hop. No pacing, congestion loss at intermediate routers. End node waiting for ever for lost fragments. Time-out and retransmit everything

* David Black (TSV): can you explain again first bullet? (recomposition at every L3 hop ?)

* Pascal: explains route-over and mesh-under.

* David: effectively asking router to route and forward a packet it hasn't received.

* Carsten: what is been proposed here has been around for decades.

* Pascal: not mentioned label swap

* Pascal: it's about creating state for next fragment. WHEN do we know we can clear that state?

* Carsten: a lot of implementation issues, timing, etc. Conflated with retransmission.

* Carsten: this message back has been there for long time.

* Spencer ????: most packets being fragmented?

* Pascal: firmware upgrade, occasional large sensory data

* Spencer: if lost, retransmitting whole packet or just a fragment?

* Pascal: currently, the whole packet. Uses energy, bandwidth. Locks reassembly buffer until timeout just for one missing fragment.

* Carsten: Radio layer ack provides retransmission

* Pascal: over one hop, yes. If lost in the middle of network, screwed.

* Rahul: this is important problem to solve. Relay forwarding the fragment increases collision rate. Another pb with single buffer strategy is long waiting time. E.g. 10 fragments, ... long waiting time at source

* Gabriel: This is not about designing a solution yet.

* Thomas; An important problem to solve. Major pain is to have to re-assemble at every hop. Just provided comments on this draft. If solution already available, can't wait. Don't

* Pascal: Resuming presentation. Requirements.

* Benefit of pacing transmission at source, to avoid bloating intermediate nodes.

* Incorporate some form of ECN? Is it overkill?

* draft has proposal that solves all requirements.

Open Discussion on Fragmentation

Moderated by Chairs

20 min

* Samita summarizes RFC4944 goals. The chairs put together a few questions to sense WG interest to address and solve fragmentation issues in 6lo.

Question:

* Does mesh-under fragmentation for links other than 15.4, need any more work?

* Does the WG want a solution for route-over?

* Carsten: Discuss things that exist.

* Gabriel: anybody think IETF should do work for mesh-under? No hand

* Gabriel: anybody should do something for the route over? about 20 hands out of 30-40 in the audience.

* Will report on the mailing list what was seen here, and ask question again

* Carsten: we should describe what we want to do. 1) describe what has been done for decades. 2) recommendations for implementation for good timing in the presence of ... 3) do we want to add a completely new thing, i.e. over full mesh

* Gabriel: a Design Team should be formed and report on what needs to be done.

* Gabriel: lot of question you're asking are right.

* Gabriel: who would like to be on the design team? 6-8 hands.

* Carsten: First collect the research done on this topic.

* Will confirm on the mailing list.

Meeting has been adjourned around 5:50p local time.